

always met with success. Certain lakes possessing all the obvious biological and physical requirements have been repeatedly planted without result, and it has been but recently determined, through the work of Prof. E. A. Birge, that the failure is due to peculiarities of the gaseous content of the water. In a paper on the gases dissolved in the waters of Wisconsin lakes, Dr. Birge illustrated his studies, which are of the highest value to fish culture.

A paper on the utilisation of sea-mussels and dogfish as food, presented by Dr. Irving A. Field, opened a very general discussion on a subject which appealed to both the biologists and the practical fishermen. During recent years the horned dogfish (*Squalus acanthias*) has been extremely destructive to fish and fishing on the coasts of Canada and New England, while the smooth dogfish (*Mustelus canis*) is a perennial menace to the lobster. In Canada oil and fertiliser works have been established for the purpose of supplying a market and encouraging the destruction of the dogfish, and Prof. Prince is of the opinion that they have to some measure decreased in numbers.

Dr. Field's experiments have demonstrated that the smooth dogfish, salted and dried, makes a product closely resembling the cod, and in a fresh condition it is not inferior to texture and flavour to halibut; the horned dogfish, being more oily, is better adapted for tinning. Mr. Fryer stated that the equally destructive dogfish of the English coasts had been placed on the markets by the fishermen, and while it was unobjectionable as to quality, it met with prejudice on account of its name, a difficulty which also confronts the exploitation of dogfish as food in the United States and Canada. An euphonious name, not deceptive in character, would assist greatly in converting a fishery menace into a valuable product and important source of cheap food supply. The practical difficulties confronting the utilisation of these fish are being made the subject of inquiry by various technical bodies in the United States and Canada.

A communication from the Rhode Island Commission of Inland Fisheries, in reference to the effects of gun-fire on schools of fishes, developed a difference of opinion between the scientific men and the practical fishermen. The latter declared that the heavy detonations from cannon drive the fish away from the coast, but the results of experiments at Woods Hole, as recounted by Dr. Sumner, indicated that mackerel and other surface-living fishes were but little disturbed by either gun-fire or the noises made by boats using explosive engines. The investigations of Dr. Parker at the fisheries laboratory prove that certain fishes are influenced by sound stimuli as distinguished from the grosser mechanical vibrations of the water, but that their sudden movements of alarm are dictated by sight rather than by hearing.

Eighteen corporations and individuals interested in the fisheries offered prizes for contributions on special subjects, and of these seven were unawarded, either because the papers submitted did not satisfy the strict conditions of the award or because they did not conform to the standard of merit imposed by the international jury of awards. Two awards were made to Prof. A. D. Mead for the papers above-mentioned, two to Dr. H. F. Moore for papers on the sponge fisheries and on growing sponges from cuttings, one to Mr. Dwight Franklin for the best method of preparing fishes for museum purposes, one was divided between Dr. F. A. Lucas and Mr. R. W. Minor, for papers on the best plan for an educational exhibit of fishes, one was given to Mr. Chas. H. Stevenson for the paper above alluded to, one to Mr. Paul Reighard for the best plan to promote the white-fish production of the Great Lakes, one to Prof. Jacob Reighard for the best methods of observing the habits and recording the life-histories of fishes, one to Mr. Chas. G. Atkins for a paper on foods for use in rearing young salmonoids, and one to Mr. John J. Solomon for a process for preserving the pearl fisheries and increasing the yield of pearls.

Many papers of much practical and scientific merit were submitted, but not read for lack of time, but they will be published in the proceedings of the congress. The fifth congress will be held in Rome in 1911, the year of the semi-centennial of the Italian Federation.

PSYCHOLOGY OF PLEASURE AND PAIN.

THE last two numbers of the *Psychological Review* (July and September) have contained important articles by Prof. Max Meyer, of the University of Missouri, on the nervous correlate of pleasantness and unpleasantness. In the former the author brings out the contradictory character of the present views of psychologists on this subject, and in the latter proposes a theory that he believes accords with all known facts and gives proportionate weight to the various aspects of the question upon which his predecessors have dwelt too exclusively. The clearest opposition has hitherto been between the psychologists, who hold that pleasantness and unpleasantness are merely weak (and therefore badly localised or entirely unlocalised) forms of the sensations, which at a higher degree of intensity become respectively sexual sensation and pain, and those who, denying their substantive status, regard them merely as aspects or "tones" of sensational processes.

Prof. Meyer's theory is of a different type altogether, and is based upon the concept of an hierarchy of reflex arcs or a "centralisation by degrees." Let A and B be two sensori-motor systems of neurons relatively independent, but having at least one connecting neuron in common. It is always possible for these to merge into a more complex sensori-motor system, C. The marks of this higher organisation will be (1) that stimulation of a sensory point of either A or B may produce simultaneous reactions at motor points both of A and B; and (2) that simultaneous stimulation of sensory points of both A and B may produce a reaction at a motor point of A or B only. In the case of such a system, if the subsystem A is functioning a strong stimulation of subsystem B will produce a decrease in the intensity of the current in A (drawing it off, in fact, towards motor points of B), while a gentle stimulation of B will merely increase the current setting towards motor points of A. The decrease or increase in the flow through system A, due to the action of B, is the nervous event which will be experienced as unpleasantness or pleasantness respectively. For example, the slight degree of pain produced by scratching after an insect's bite is rather pleasant, for it actually increases the energy of the scratching process. If, however, the pain becomes too intense, its own typical reaction is set up; energy is drawn off from the scratching process, and unpleasantness is felt.

It follows on this theory that pleasantness and unpleasantness are attributes of the relatively more complex psychophysical functions, and, therefore, that their highest intensity may be expected to accompany intellectual activity—a result which the author claims as a powerful piece of evidence of the superiority of his doctrine over that which would regard them as "feeling tones" of sensations.

SCIENTIFIC EDUCATION OF NAVAL ARCHITECTS.¹

IT has occurred to me that an appropriate subject for the address, which it is my duty to deliver as chairman of the council, may be found in a brief account of the methods adopted for the education of naval architects in this country during the past century. I venture to hope that, apart from its particular interest for those engaged in shipbuilding, the narrative may have some value and attraction for those interested in technical education generally, and that it may throw some light on problems of higher technical education which still await solution in this country.

In 1806 the Commission of Naval Revision reported in regard to the principal shipbuilding officers of the Royal Navy. There is evidence that outside the Admiralty service the standard of professional attainment amongst British shipbuilders was then low. As practical ship-carpenters they excelled; their ships were "well and truly built," strong and durable. As ship-designers they depended on

¹ From an address delivered before the Society of Arts on November 18 by Sir W. H. White, K.C.B., F.R.S., chairman of the Council of the Society.

precedent and experience. British warships were designed in accordance with "established dimensions," according to which ships of a certain tonnage carried a certain number of guns of specified sizes. The tonnage was estimated by an unscientific rule; and a competent authority, speaking of the condition of things existing at the beginning of the last century, asserted that "scarcely an individual in the country knew correctly even the first element of one of our numerous ships." As a matter of fact, the official "established dimensions" were varied but little from 1680 to 1810, and there was practical stagnation in British shipbuilding.

Instead of advance having been made in the practice of naval architecture in this country during the eighteenth century, there is reason to believe that there had been retrogression, so far as scientific knowledge and methods were concerned.

The movement in favour of better education for British shipbuilders and the adoption of scientific methods in ship design a century ago was chiefly due to men unconnected with the industry, and was not welcomed by shipbuilders of the older school. Fortunately, opposition from various quarters was overcome, and the first school of Naval architecture began its work at Portsmouth in January, 1811, under the direction of Dr. Inman, a distinguished graduate of the University of Cambridge. The intention was to train men who should unite sound practical experience with high scientific knowledge, to give them employment subsequently at sea and in the work of ship-designing, and so to provide efficiently for the higher ranks of officers at the Admiralty and in the Royal dockyards.

When the steam-reconstruction of the Navy had to be undertaken about fifty-five years ago, and was rapidly followed by the use of armour as a protection against attack by explosive shells, it became impossible any longer to pretend that naval officers, untrained as naval architects, could undertake the responsible work of designing British warships. Fortunately, trained men were available in the persons of Dr. Inman's old pupils, who had been compelled to wait twenty years before their opportunity came.

Sixteen years elapsed before a second school of naval architecture was established by the Admiralty at Portsmouth, under the title of the "Central School of Mathematics and Naval Construction." Five years earlier the Admiralty had framed a scheme for schools in the Royal dockyards, at which all apprentices were required to attend "every afternoon for three hours, commencing an hour and a half previous to that at which the yard closes." Under this rule the Admiralty paid the boys' wages for one-half the period of school attendance, and required them to give the other half out of their own time. Beginning with "elementary matters, such as reading, writing, common and decimal arithmetic, Scripture, English history, and geography," the apprentice passed on to more advanced instruction. At the end of three years a selection was to be made by means of an examination, and those whose abilities entitled them to a higher course of instruction were allowed to attend school for two years more. For the majority of apprentices this ended their education: but the Admiralty order provided that "two or three of the best apprentices in each yard should be elected to the first class, should be instructed in 'laying off' and the leading principles of ship construction, and, so far as it is necessary for that purpose, should be taught mechanics, hydrostatics, and mathematics." Its main features have been continuously maintained for sixty-five years, with results which more than justify any expenditure incurred. As the national standard of elementary education had been raised, so the required standard for the admission of apprentices had been elevated, and out of the dockyard schools there had come multitudes of well-educated, intelligent workmen, from amongst whom, by a process of gradual selection, had been found subordinate and principal officers for the Admiralty service, while no small number had passed from that Service into the private trade, and occupied positions of importance and responsibility in shipyards throughout the country and on the staffs of the registration societies for shipping of which Lloyds' Register is the greatest. The scheme is broad and generous; it gives facilities and aid, while requiring apprentices on their side to study in time that would other-

wise be their own for leisure or recreation. It carries on, side by side, practical and educational training; it exercises a gradual selection of those whose ability and application show them to be capable of benefiting by higher instruction. It sets up a "ladder of learning" from the lowest level, and there has been no bar to any capable man in striving to reach the highest position. Its cost is extremely moderate in proportion to its beneficial results. For the current financial year the dockyard schools at home and abroad are estimated to cost less than £2000, while the wages vote for these establishments exceeds two and a half millions sterling.

The second school of naval architecture constituted the final stage in the Admiralty scheme for the technical education of its naval architects. Its students were intended to be the pick of dockyard apprentices of five years' standing, who during that period had received an excellent general education, a good training in the practice of shipbuilding, and a special course of mathematics bearing on naval construction. It differed from the first school, therefore, because the former institution had been intended exclusively for a higher class of apprentices, to whom appointments were guaranteed when their course of training was satisfactorily completed. In other words, the fundamental idea of the first school was to train students who were intended to become superior officers subsequently. On the contrary, the working apprentice class, by a process of selection applied at intervals during five years, was intended to supply the students to be trained in the second school, and they were not guaranteed appointments similar to those promised to their predecessors.

Cambridge University again supplied a principal for the school of naval construction in the person of Dr. Woolley, who proved a worthy successor to Dr. Inman. During the five years of its existence men were trained who subsequently achieved high distinction in the theory and practice of shipbuilding, and who proved capable of taking up the primary responsibility for warship design when age and failing powers compelled the retirement of men trained in the first school. The grave responsibilities incidental to the iron-clad reconstruction were borne, and successfully borne, by men from this college for a period of more than twenty years, and it was a fortunate circumstance that the Central School of Mathematics and Naval Construction was in existence even for so brief a period, because its students ably filled the gap that would have otherwise existed in the ranks of trained naval architects at a most critical period in our naval history.

The third school of naval architecture was founded in 1864, and placed at South Kensington, the Education Department being associated with the Admiralty in its establishment and maintenance. Its creation was due to the action of the Institution of Naval Architects, which had been formed in 1860 on the joint initiative of naval architects trained for the Admiralty service, of a number of leading private shipbuilders and marine engineers, and of naval officers, yachtsmen, and men of science. In many respects the Royal School of Naval Architecture and Marine Engineers differed from, and was more comprehensive than, its predecessors.

The new school was intended to train students for the private industry as well as for Admiralty service. Its founders hoped to attract the sons and relatives of shipbuilders and marine engineers, as well as to provide for young men selected by the Admiralty from the dockyard schools. Marine engineering was recognised as the younger sister of shipbuilding, needing equally good and systematic training for those making it their career. Foreign students were admitted as well as British subjects. The institution was designed to be, or to become, a school of which the greatest maritime nation of the world might be proud. It started under the fairest auspices; there was no failure in organisation, courses of study, teachers, or lecturers; the Admiralty played its part and sent up well-prepared students; foreign Governments also sent students, but in regard to private British students there was disappointment, both as to numbers and previous preparation. What should have been the chief source of supply for British students, and for income, failed lamentably. Looking back on the result, it does not appear so surprising as it did at the time. The scheme of instruction was admir-

able, only it required for its good working a standard of previous attainment, which was reached only by Admiralty students who had spent five or six years in practical work at the dockyards, and in attendance at the special schools therein provided. Even the best of the private students were far less advanced on entry, consequently very few of them were able to benefit fully from the higher and specialised instruction provided at South Kensington. Many private students did derive advantage from attendance, and have shown this to be true in their subsequent careers. On the whole, however, it must be admitted that the scheme was pitched too high in relation to the means of preliminary instruction then existing in this country, and that to give it full effect a preparatory school should have been created also, through which students could have passed before proceeding to the Royal School of Naval Architecture. Even to this day one of the greatest difficulties in the way of utilisation by students of the higher instruction provided in technical colleges consists in the want of proper preparation.

There are certain distinctive features in the arrangements at the Royal Naval College which have stood the test of thirty-five years' experience, and consequently may be worth consideration by those engaged or interested in technical instruction elsewhere. To a few of these I would refer, because they have a bearing on higher technical education in its general aspect.

First, great care is taken thoroughly to prepare the Admiralty students before they enter the college, so that they may derive full advantage from the special facilities existing there. For many years past the Admiralty has maintained at Devonport a college in which those who are to become engineer officers of the Navy receive a practical and scientific training extending over four or five years. Entry to this school has been governed by competitive examinations, and the parents of students have been required to contribute to the expenses of the education of their sons, so that the selection of the students has been made from a higher class than that which furnishes ordinary dockyard apprentices. At the end of the training in this preparatory college a final selection is made of a limited number of students of naval architecture and marine engineering, who proceed to the Royal Naval College to undergo a further period of three years' training in the higher branches of their profession. During the three years' course at the college the summer vacations of the students are spent in the Royal dockyards on practical work, so that Admiralty practice for about forty-four years has represented what is now termed the "sandwich system" of instruction, and it has worked well.

Secondly, private students admitted to the Naval College have been required to possess and give evidence of possessing a knowledge of practical shipbuilding obtained by a period of service in shipyards, as well as a certain standard of attainment in mathematical and scientific subjects. In Germany a similar condition has been insisted on in recent years, and a period of practical training must be undergone by every student who aims at any branch of engineering as his life's work, in the interval between leaving the secondary schools and entering the higher technical schools.

Thirdly, the teachers of naval architecture and marine engineering at the Royal Naval College are officially called "instructors," but really perform the duties of professors. They are appointed only for limited periods, coming from and returning to their professional work. All of them have been distinguished graduates of the college, and, after the completion of their studies, have acquired considerable practical experience at the Admiralty, in the dockyards, and (in many cases) during periods of service at sea. Thus equipped they enter upon their work as teachers. It is ensured that teachers never "lose touch" with the practical side of their professional work, and shall never continue so long in the position of instructors as to become stale, and therefore less capable of dealing with the professorial duties entrusted to them.

Care seems to be required also in another direction at the present time. No teacher of any branch of engineering can be regarded as properly qualified until he has gained actual experience and borne the burden of responsibility in connection with the design and execution of

important works. It should never happen that those who teach should be lacking themselves in one side of the training—and that the not less important side—which, by common consent, is needed for the modern engineer. The Admiralty system meets this requirement, and has worked well. It has furnished capable professors of naval architecture and marine engineering, not merely for Admiralty establishments, but for universities at home and abroad.

Turning to results obtained from the work of the Royal Naval College during the last thirty-five years, it must suffice to say that they have been altogether satisfactory when judged by the positions which have been or are occupied by men who graduated there. The Admiralty staff of naval constructors and marine engineers has been mostly recruited from that source, and the highest offices have been successfully filled by ex-students of the Royal Naval College.

It may be interesting to add that about twenty-five years ago the Admiralty constituted a Royal Corps of Naval Constructors. The scheme for that corps provided for the admission of qualified men who had not received their training under the Admiralty, or in Admiralty establishments, subject to the condition that candidates for entry showed proof (by examination and by recorded service) of thorough training in both the science and practice of shipbuilding.

Closely allied with the scientific education of shipbuilders and marine engineers is the provision for instruction of naval officers and shipowners in the fundamental principles governing the construction and propulsion of ships. As regards officers in war-fleets and in mercantile marines, it is advantageous that they should possess some knowledge of the principles of buoyancy, stability, and structural strength, and should have mastered the elements of engineering. On the side of shipowners similar knowledge would undoubtedly assist commercial success. From the nature of the case shipowners must determine the governing conditions of the trades in which ships are to be employed, and naval architects must discover the best possible solutions of the problems laid before them. In the case of warships, naval officers properly claim the right to select the qualities of armament, protection, speed, coal endurance, &c., which they wish to have embodied in designs. It is equally undesirable for the naval architect to assume the right of laying down the conditions to be fulfilled in new designs, as it is for shipowners or naval officers to assume the position of amateur ship designers. If naval officers or shipowners can be endowed with an understanding of the elementary principles affecting ship construction and propulsion they must be better able to appreciate what is or is not possible under the conditions of practice, and therefore they will be much less likely to lay down conditions which are incompatible with one another or impossible of realisation. These considerations led me to suggest in 1873 that the Department of Naval Architecture in the Royal Naval College at Greenwich should include classes in which officers of the higher ranks in the Royal Navy should receive elementary instruction of this kind. These classes have now been in successful operation for more than thirty years, and there is ample evidence of their utility. Subsequently to the establishment of these classes at Greenwich it was decided also to give systematic instruction to junior naval officers in the principles of shipbuilding and engineering, and good results were obtained. In the most recent arrangements for the education of naval officers at Osborne and Dartmouth fuller expression has been given to the same idea, and no one questions the advantages which will be gained thereby. In these days it is obviously a necessity that every naval officer charged with the great responsibilities attaching to the use and management of warships, which are full of complicated machinery, should possess a considerable knowledge of engineering. The only matter on which difference of opinion exists is in regard to the further training of that class of officers who will eventually be placed in responsible charge of the propelling and other machinery of warships.

From the preceding remarks it will be understood that the sole provision made for the higher education of British naval architects for a very long period was in schools established by the Admiralty; but this reproach was re-

moved about a quarter of a century ago by the creation of a professorship of naval architecture in the University of Glasgow, thanks to the generosity of Mrs. John Elder. About the same time a professorship of engineering was established in connection with the University of Durham at the College of Science (now the Armstrong College), Newcastle-on-Tyne, and instruction in naval architecture is included in the curriculum of studies in this department. It was always desired to have an independent professorship of naval architecture in this great centre of shipbuilding, and by persistent effort this desire was fulfilled about a year ago. The country now possesses three schools of naval architecture, two of which are independent of the Admiralty, and sustained by the private shipbuilding industry.

It has been suggested that the multiplication of schools of naval architecture in Great Britain may be overdone, but when compared with the provision now made for the education of naval architects in Germany, France, and the United States, and taking into account the overwhelming preponderance of British shipowning and shipbuilding, there need be no fear that four schools of naval architecture, each with a considerable number of students, would constitute an excessive provision for this country. In the Technical High School of Charlottenburg, near Berlin, there were not long ago about 400 students of naval architecture and marine engineering, all of whom had received adequate preparatory training before entering the high school and specialising in these studies. Even at the present time the total number of equally qualified students of naval architecture and marine engineering attending the classes in British schools is only about 170, or less than one-half the number of men studying at Charlottenburg. In the United States excellent schools of naval architecture exist at the Massachusetts Institute of Technology and as departments in several universities. These are well equipped, and attended by considerable numbers of students. When it is borne in mind that the aggregate tonnage of steamships belonging to the British Empire is seventeen millions of tons, as against 3,705,000 tons owned by Germany and 1,542,000 (exclusive of the shipping on the great lakes) owned by the United States, and that in 1907 the gross tonnage of ships launched in the United Kingdom aggregated 1,608,000 tons, as against 291,000 tons for Germany and 486,300 tons for the United States, it will hardly be maintained that the provision made or contemplated for the higher education of British naval architects is likely to prove excessive.

Possibly it may be thought that the German provision for such education is extravagantly large, and that the number of highly trained men who annually pass out from the High School at Charlottenburg is in excess of the real requirements of the shipbuilding industry of that country. This is not the opinion entertained in Germany itself, for another school of naval architecture has been created at Dantzig recently.

The last half-century has witnessed unprecedented progress in British shipping and shipbuilding. It is apt to be forgotten that when the Civil War broke out the tonnage of American shipping was rapidly overtaking that of this country, and threatened to surpass it before long. It is true, no doubt, that the lead which we took in the use of iron instead of wood as the chief material of construction, and in the development of steam navigation, helped forward the remarkable progress that has been made. It is equally true that great assistance to progress has been given by the application of scientific methods to ship construction and propulsion. It would be ridiculous to suppose that the contemporaneous development of technical and scientific training amongst naval architects and marine engineers had only been a coincidence, and had not played a great part. Many circumstances, as well as many persons, have assisted in bringing British shipping and shipbuilding into its present unrivalled condition, but the underlying and predominant cause must be found in the general recognition of the necessity for scientific as well as practical training on the part of those engaged in the design and construction of ships and their machinery.

Ship-designing can never be dealt with on purely scientific methods. Exact estimates cannot be made of the

most trying conditions to which ships at sea may be subjected. Accumulated experience, based on careful observation and experiment, must always be the foundation of successful work. Direct experiments on models of ships and propellers are of incalculable value; but the arrangement and conduct of these experiments, the carrying out of observations on the behaviour of ships, the grouping and analysis of results, and the deduction therefrom of facts and principles for future guidance, all demand scientific knowledge and scientific procedure. Of course, this is not peculiar to shipbuilding, and I have no desire to magnify the importance of that branch of engineering to which my life has been devoted. It is equally true of engineering as a whole, and of the applications of science to industrial processes generally. My chief object in describing to-night what has been done in the technical education of naval architects has been to present an object-lesson to those interested in technical education as a whole.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Prof. Adam Sedgwick, president of the Philosophical Society, has been appointed to represent the society at the Darwin centenary celebrations in June, 1909.

In a letter to the Vice-Chancellor, the secretaries of the Royal Society announce that, as Sir William Huggins desires now to relinquish the care of the stellar spectroscopic equipment placed in his hands by the Royal Society in 1871, the president and council of the society are prepared to present these instruments as a gift towards the equipment of the astrophysical department of the Cambridge Observatory, subject to an assurance of their permanent profitable employment being obtained. This assurance having been given by the observatory syndicate, the installation will be transferred permanently to the University as it now stands in full working order in Sir William Huggins's observatory. In view of the historical importance of this equipment, and its intimate connection with the foundation and development of the science of astrophysics, it is desired that the name of Sir William Huggins be permanently connected with the instruments.

The electors to the Isaac Newton studentships give notice that, in accordance with the regulations, an election to a studentship will be held in the Lent term, 1909. These studentships are for the encouragement of study and research in astronomy and physical optics. The persons eligible are members of the University who have been admitted to the degree of Bachelor of Arts, and who will be under the age of twenty-five years on the first day of January, 1909. It will be the duty of the student to devote himself during the tenure of his studentship to study or research in some branch of astronomy or physical optics. The student's course of study or research must be, as a rule, pursued at Cambridge. The studentship will be tenable for the term of three years from April 15, 1909. The emolument of the student will be 200*l.* per annum, provided that the income of the fund is capable of bearing such charge.

LONDON.—The new deans of faculties are:—for medicine, Prof. S. H. C. Martin, F.R.S.; for science, Prof. J. M. Thomson, F.R.S.; for engineering, Prof. W. E. Dalby.

Prof. T. G. Brodie has resigned his post as professor-superintendent of the Brown Animal Sanatory Institution on his appointment as professor of physiology in the University of Toronto.

The degree of D.Sc. in physiology has been granted to Dr. F. H. Scott, an internal student, of University College, who submitted a thesis entitled "On the Relative Parts played by Nervous and Chemical Factors in the Regulation of Respiration," and other papers; also to Dr. H. W. Bywaters, an internal student, of the physiological laboratory of the University, who submitted a thesis entitled "An Inquiry into the Chemical Mechanism concerning the Absorption of Protein and Carbohydrate Food," and other papers.

A separate board of studies is to be constituted for ethnology.